

A NEW SPECIES OF CECIDOMYIIDAE (DIPTERA) DAMAGING  
SHOOT TIPS OF YELLOW CYPRESS, *CHAMAECYPARIS*  
*NOOKATENSIS*, AND A NEW GENUS FOR TWO  
GALL MIDGES ON CUPRESSACEAE

RAYMOND J. GAGNÉ AND R. W. DUNCAN

(RJG) Systematic Entomology Laboratory, PSI, Agricultural Research Service, USDA,  
% U.S. National Museum NHB 168, Washington, D.C. 20560; (RWD) Pacific Forestry  
Centre, Forestry Canada, 506 West Burnside Road, Victoria, B.C. V8Z 1M5, Canada.

---

*Abstract.*—A new species of gall midge (Diptera: Cecidomyiidae) infesting the shoot tips of yellow cypress, *Chamaecyparis nookatensis*, in British Columbia is described and illustrated. A new genus, *Chamaediplosis*, is erected for the new species and one other, previously described species, *Contarinia rugosa*, known from *Cupressus arizonica*. The new genus belongs to the tribe Cecidomyiini.

*Key Words:* gall midges, western North America, taxonomy

---

A new species is described here that was first discovered in 1987 damaging the shoot tips of yellow cypress, *Chamaecyparis nookatensis* (D. Don) Spach (Cupressaceae) in British Columbia. The large numbers of infested and ultimately killed shoot tips at one site indicate that this species could become a serious pest (Fig. 1). The new gall midge has one generation per year at Saanichton, British Columbia. Most overwintering larvae (Fig. 2) pupate within the galls in late winter. Adults emerge soon after (Fig. 3); others pupate in the spring or early summer. Each gall usually contains one larva, but occasionally two, rarely three, are found.

A new genus is erected for the new species and *Contarinia rugosa* Gagné, another species that lives in shoot tips of Cupressaceae (Gagné 1986b). A separate paper by R. W. Duncan on the biology of the new species in British Columbia is in preparation.

#### METHODS

Branches with infested shoot tips were collected in the field in February, 1987 near Saanichton, B.C. To maintain the galls in fresh condition during rearing they were placed in sealed polyethylene bags and kept at a constant 20°C until adults emerged. Adults began emerging from the galls after five days and continued for several days afterwards. Immature and adult specimens were preserved in 70% ethanol and mounted for microscopic study in Canada balsam using the method outlined in Gagné (1989). Adult terminology follows usage in McAlpine (1981) and larval terminology that in Gagné (1989). The new genus is to be attributed to Gagné, the new species to Gagné and Duncan.

#### *Chamaediplosis* Gagné, NEW GENUS

*Adult.*—*Head:* Eyes 5–7 facets long at vertex, separated by ½ to 1 facet diameter;

facets circular, closely adjacent except near midheight of eye where they may be as far as  $\frac{1}{2}$  facet diameter apart. Vertex of occiput rounded, without dorsal protuberance, with 2–3 rows of setae parallel to the periphery. Frons with several setae. Labella hemispherical, with scattered setae. Palpus 4-segmented. Male antennal flagellomeres (Gagné 1986a: Fig. 1) binodal, bicircumfilar, the circumfilar loops regular. Female flagellomeres (Gagné 1986a: Figs. 2–3) progressively shorter towards antennal apex, the circumfila appressed.

*Thorax*: Scutum with 2 lateral and 2 dorso-central rows of setae and setiform scales. Scutellum with a group of setae on each side. Mesanepisternum with 0–3 scales. Mesepimeron with 6–10 setae. Claws slightly shorter than empodia, the empodia broad, about as wide as 5th tarsomere. Wing with R5 curved apically to join C posterior to wing apex, C broken at juncture with R5.

*Male abdomen* (Figs. 4–6): Tergites 1 to 6 entire, rectangular, with mostly single, uninterrupted, posterior row of setae, 4–10 lateral setae anterior to posterior row, a few scattered scales, and pair of trichoid sensilla on anterior margin: tergite 7 as for preceding except weakly sclerotized posteromedially, posterior setae usually present only laterally; tergite 8 sclerotized only anteriorly to anterolaterally, usually bare except for anterior pair of trichoid sensilla; pleura with sparse scales; sternites 2–6 rectangular, with mostly single, caudal row of setae, with mixed setae and scales grouped near mid-length, and anterior pair of trichoid sensilla; cerci broadly rounded posteriorly, with ventrolateral setae; hypoproct deeply divided, its lobes broad, rounded apically, with apical and ventral setae; aedeagus attenuate, narrowly rounded apically, with lateral sensilla; gonocoxites stout, apodeme variously shaped; gonostylus long, narrowing slightly from base to apex, mostly striate, setulae present only near base, chiefly on venter with scattered setae and completely setulose.

*Female abdomen* (Figs. 7–9): Tergites 1 to 7 and sternites 2–7 generally as for male, but tergal setae and scales more numerous. Tergite 7 with mostly double row of posterior setae, about  $\frac{2}{3}$  length of distal half of ovipositor; tergite 8 approximately as long as 7, with anterior pair of trichoid sensilla and 0–10 short posterior setae. Ovipositor short, protrusible, proximal half anteriorly with scattered lateral and ventral setae, distal half posteriorly with scattered short setae, completely setulose, unstriated; cerci broad at base, tapering gradually to rounded apex, completely setulose, setae concentrated at base and apex; hypoproct divided into 2 lobes.

Third instar (Figs. 10–12).—Integument rugose. Spatula present, variously shaped, with 2 anterior lobes. Papillae with basic complement of papillae for supertribe (Gagné 1989), but with very short setae; terminal papillae with short setae, the usually large, corniform pair found in *Cecidomyiini* reduced in size, barely larger than remaining three pairs.

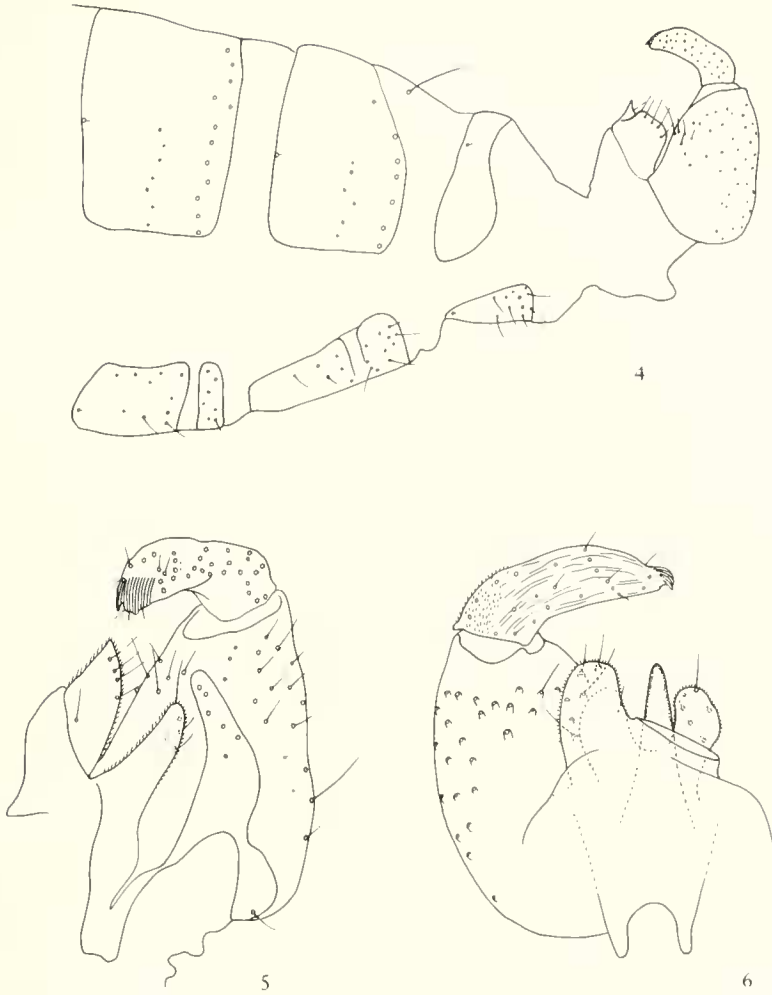
Type species.—*Chamaediplosis nootkatensis* Gagné and Duncan.

Etymology.—The name *Chamaediplosis* combines “Chamae” (dwarf, creeping) from *Chamaecyparis* with “diplosis” (double, a doubling), a commonly used suffix for gall midge genera of the supertribe *Cecidomyiini*.

Remarks.—*Chamaediplosis* contains *C. nootkatensis*, *C. rugosa*, and a third, undescribed species, known only from a series of specimens in the National Museum of Natural History in Washington, D.C. That series, from *Cupressus macrocarpa* Hartw. in California, is in poor condition and unsuitable for description. These species all infest shoot tips of Cupressaceae.

Erecting *Chamaediplosis* is a step in resolving the problem of polyphyly in *Contarinia* by dividing that genus into smaller units whose species occur on related plants and share what one can convincingly argue are shared, derived characters. *Chamaedi-*





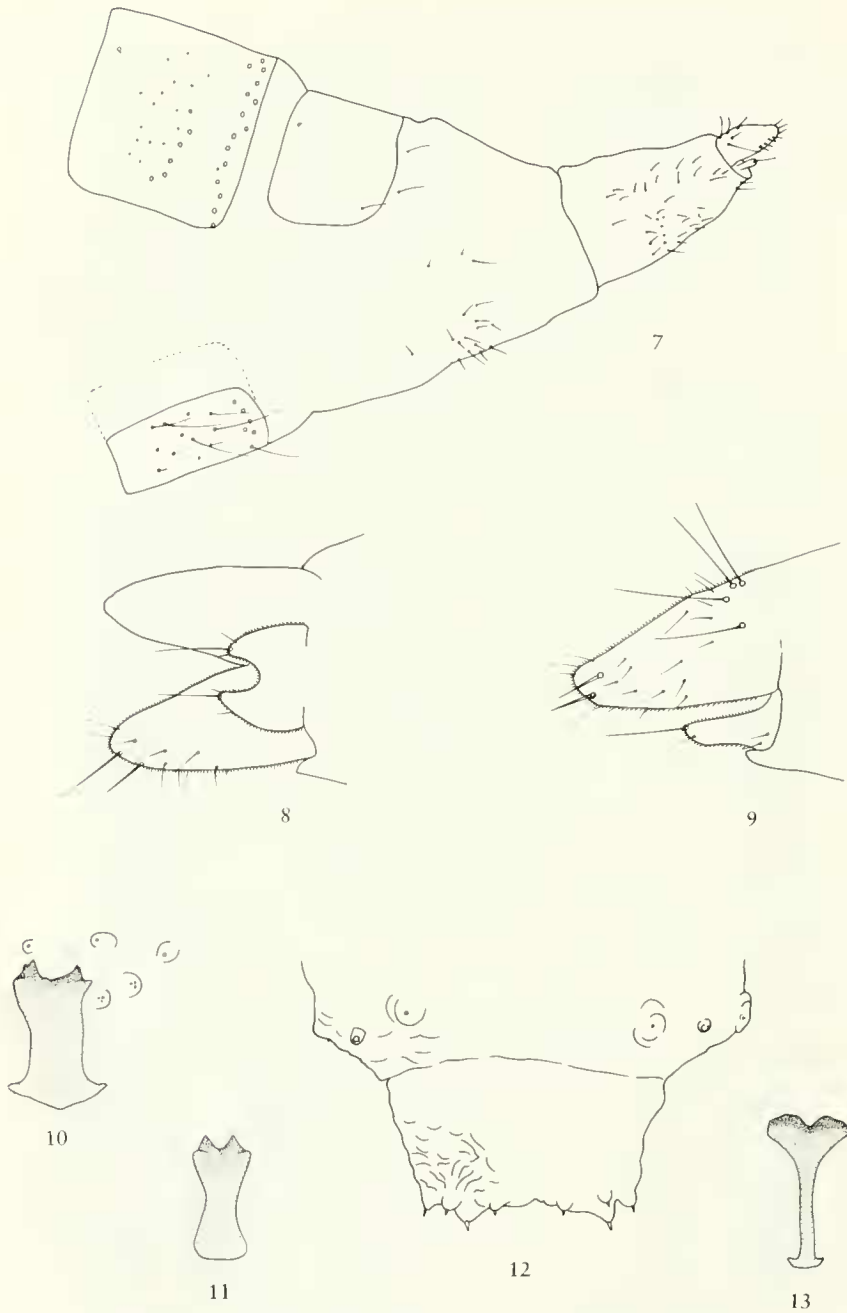
Figs. 4-6. Male, *C. nootkatensis*. 4, Abdominal segments 6 to end (lateral view). 5, Genitalia (mesal). 6, Genitalia (left side, dorsal).

*plosis* belongs to the tribe Cecidomyiini and differs from other genera in that tribe by its short ovipositor with relatively large and completely setulose cerci and the nearly uniform terminal papillae of the larva. That the ovipositor is short is plesiotypic, but its

distinctive shape and setation (Figs. 7-9), presumably well-adapted to its use, can be regarded as apotypic. One pair of larval terminal papillae that in Cecidomyiini are much larger than the three remaining pairs and has recurved corniform setae, are in

---

Figs. 1-3. 1, Normal and infested shoot tips of yellow cypress. 2, Infested shoot tip cut open to reveal larva of *C. nootkatensis*. 3, Newly emerged female of *C. nootkatensis* and its pupal exuviae protruding from infested shoot tip.



Figs. 7-13. *C. nootkatensis*. 7-9, Female: 7, Abdominal segments 7 to end; 8, cerci and hypoproct (ventral view); 9, same (lateral). 10-12, Larva: 10, spatula with associated papillae; 11, spatula; 12, segments 8-9 (dorsal). 13, Spatula of *C. rugosa*.

*Chamaediplosis* only slightly larger than that of the remaining papillae. Its small size may be a reduction or, alternatively, the primitive condition for the tribe.

Except for the shape of the ovipositor and the larval terminal papillae, *Chamaediplosis* could fit into *Contarinia*, a genus that is used as a catch-all category and has grown to include most species of Cecidomyiini with elongate, strongly tapered ovipositors (Gagné 1973). It now appears that long ovipositors suitable for laying eggs in narrow crevices of buds and flowers evolved separately many times (Gagné 1989). One conspicuous similarity between the new genus and *Contarinia* is the loss of one of the three circumfila on the male antennal flagellomeres. That is a character state that appears many times within the Cecidomyiini and is not necessarily evidence for particularly close kinship. The number of circumfila has become reduced separately elsewhere in the Cecidomyiini (*Taxodiomyia*), as well as in the Clinodiplosini (*Ametrodiplosis*), Lestodiplosini (*Endaphis*, *Dentifibula*), and Mycodiplosini (*Mycodiplosis*; Gagné and Rios de Saluso 1987). Other apotypic character states besides the bicircumfilar flagellomeres that *Chamaediplosis* and some other Cecidomyiini share but which may be the result of convergence are 1) the loss of the dorsal occipital projection of the head, 2) a certain amount of reduced setation and sclerotization in male abdominal tergites 7 and 8, 3) the deeply divided hypoproct with 2 short, cylindrical lobes, 4) the short aedeagus, 5) the presence of setulae only at the base of the gonostylus, and 6) the large empodia. The last is a character that this genus shares with most other conifer gall midges, regardless of their affinities.

#### KEY TO SPECIES OF *CHAMAEDIPOSIS*

Larvae and pupae in shoot tips of *Chamaecyparis nootkatensis*; larval spatula with triangular anterior lobes, occasionally the lobes secondarily toothed, the shaft slightly narrowed near mid-length (Figs. 10–11); female tergite 8 with 0–5

setae along posterior margin (Fig. 7); aedeagus acute at apex (Fig. 6)

..... *C. nootkatensis* Gagné and Duncan  
Larvae and pupae in shoot tips of *Cupressus arizonica*; larval spatula with rounded anterior lobes, the shaft much narrowed posteriorly (Fig. 13); female tergite 8 with 10–12 setae along posterior margin; aedeagus broadly rounded at apex  
..... *C. rugosa* Gagné

#### *Chamaediplosis nootkatensis*

Gagné and Duncan,

NEW SPECIES

Adult.—Wing length, 2.0–2.5 mm. Thorax: anepisternum usually with 0, occasionally 1 scale; anepimeron with 6–9 setae. Male postabdomen as in Fig. 4, genitalia as in Figs. 5–6, the apodeme variable, bifurcate (as shown, Fig. 7) or entire. Female postabdomen as in Fig. 7, cerci and hypoproct as in Figs. 8–9.

Third instar.—Orange. Spatula (Figs. 10–12) short and broad, anteriorly with two triangular lobes, these sometimes secondarily divided. Papillae all on mamelons. Posterior segments as in Fig. 12.

Holotype.—Male, ex *Chamaecyparis nootkatensis*, Saanichton, British Columbia, III-3-1987, R. Duncan, deposited in the Canadian National Collection in Ottawa. Paratypes, all ex *Chamaecyparis nootkatensis* from Saanichton, B. C.: 2 males, 2 females, II-23-1987; 2 males, 1 female, III-3-1987; 4 males, 3 females, III-10-1987; 5 males, 2 females, IV-22-1988; and 5 larvae, IV-11-1987. The paratypes are divided among the U.S. National Museum of Natural History, Washington, D.C., the Pacific Forestry Centre, and the Canadian National Collection.

Remarks.—Except in the shape of the larval spatula, this species is very similar to *C. rugosa*. Adults of the two species can be separated with the help of the minor differences outlined in the key given earlier.

#### ACKNOWLEDGMENTS

We are grateful to P. Malikul for making the slide preparations, L. Manning for tech-

nical help, D. L. Roney for inking Figs. 4-13, and K. M. Harris, N. E. Woodley, and J. Yukawa for their review of the manuscript.

#### LITERATURE CITED

- Gagné, R. J. 1973. A generic synopsis of the Nearctic Cecidomyiidi (Diptera: Cecidomyiidae). *Ann. Entomol. Soc. Am.* 66: 857-889.
- . 1986. A new Nearctic species of *Contarinia* (Diptera: Cecidomyiidae) recently introduced into Hawaii on *Cupressus* (Cupressaceae). *Proc. Entomol. Soc. Wash.* 88: 127-130.
- . 1989. The Plant-Feeding Gall Midges of North America. Cornell University Press, Ithaca, New York. xiii of 355 pp. and 4 pls.
- and M. L. A. Rios de Saluso. 1988. A new rust-feeding *Mycodiplosis* (Diptera: Cecidomyiidae) associated with rust on *Avena sativa* (Poaceae) in Argentina. *Ser. Tecn. Inst. Nac. Tecnol. Agropecu. Parana Entre Rios Argent.* 54(1987): 1-12.
- McAlpine, J. F., B. V. Peterson, G. E. Shewell, H. J. Teskey, J. R. Vockeroth, and D. M. Wood, eds. 1981. *Manual of Nearctic Diptera*. Vol. 1. Research Branch, Agriculture Canada. Monograph No. 27. vi + 674 pp.